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MOHENJO-DARO

AND THE
CIVILIZATION OF ANCIENT INDIA
WITH REFERENCES TO AGRICULTURE

BY

N. C. CHAUDHURY

M.R.A.S., DP. AGRI., SIBPUR

LATE OF THE PROVINCIAL AGRICULTURAL SERVICES
BENGAL AND BIHAR AND ORISSA

AUTHOR OF

"JUTE AND SUBSTITUTES", "AGRICULTURAL CHEMISTRY", &c.

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PREFACE

INDIA is known to be a country of the oldest civilization and it was supposed to have originated from the Aryans who had settled in this Country, some 2,000 years before Christ. But, recent excavations at Mohenjo-daro (1922-27), by the Archaeological Department, Government of India, under the supervision of Sir John Marshall, the then Director General of the Department, reveal that there had been in India, an older civilization, over 2,000 years before the Aryan settlement.

The writer takes pleasure in placing before the public, the materials, from Sir John Marshall's excellent work (1933) which refer to some of the more important agricultural products and implements and attempts to trace their history and developments up to end of the Ancient Indo-Aryan civilization.

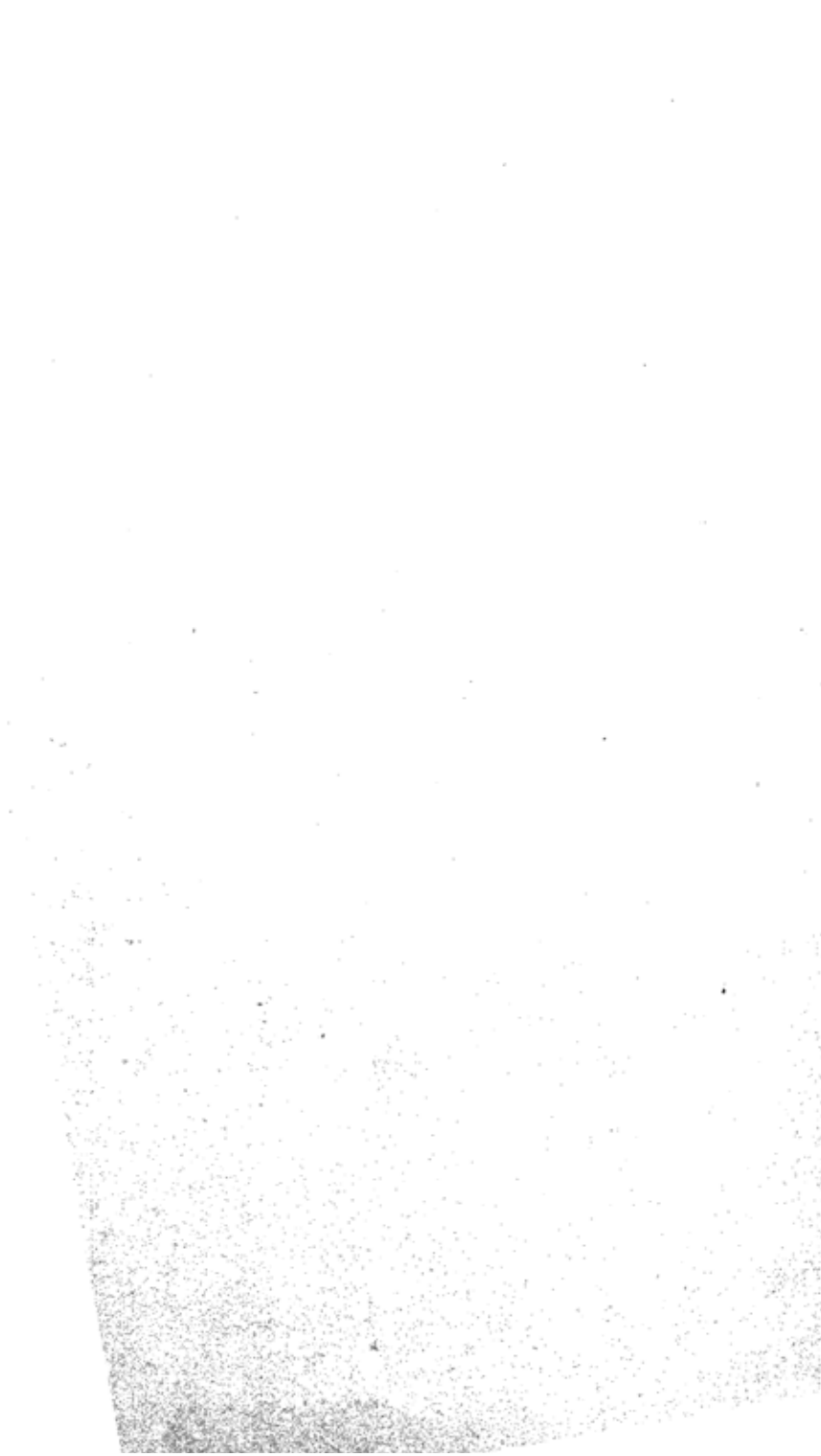
The author takes this opportunity to acknowledge his indebtedness to Mr J. F. Doyle, one of the senior Directors of Messrs. W. Newman & Co. Ltd. Booksellers and Publishers who was pleased to remark that this booklet should be of great interest to the public. He also advised the Company to publish the booklet for me.

N. C. Chaudhury



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MOHENJO-DARO

AND THE

CIVILIZATION OF ANCIENT INDIA

WITH REFERENCES TO AGRICULTURE

RESULTS OF THE EXCAVATION

THE results of the recent excavations (1922-1927), at Mohenjo-daro, situated on the western bank of the river Indus, in Sind, about 200 miles north from Karachi, towards the Punjab, will supply historians with interesting material for revision of the history of ancient India. Sir John Marshall records the results, most carefully and admirably in his famous work, "Mohenjo-daro and the Indus Civilization."

Mohenjo-daro was a prosperous ancient city of pre-historic period of Stone and Copper ages, with magnificent buildings of fire-burnt and sun dried bricks, metalled roadways, drains, tanks and wells. There were well planned baths, lavatories and temples attached to the houses of rich citizens. From the ruins, various articles of luxury and of common use, made of stone, earth, copper and bronze have been discovered. There are arms, bows and arrows, knives, spears, axes, daggers, agricultural implements, carpenters' tools, tablets, images of animals (buffalo, bull, rhinoceros, tiger, elephant, camel, gharial, antelope,

goat, sheep, pig, dog, etc.) of stone, copper and bronze. The horse is absent.

Seals or seal impressions of various designs and shapes, faience and stonemade house-hold vessels, glazed pottery, spindles of copper or bronze and whorls made of shell, faience and pottery for spinning and weaving, sickles, saws, razors of copper and bronze, needles of copper, bronze and bone, and bronze fish-hooks and needles, bodkins, combs of bone, ivory and shell, came to light.

Ornaments of stone, copper, bronze, shell, silver and gold, specimens of wheat, barley, date palm seeds, fragments of cotton and images of the deity Siva, goddess Sakti, and that of Siva-Lingam of stone have been discovered. There are a large number of female figurines of terracotta and many human statues and statuettes of fine red stone and also of dark gray slate, including a bronze made statue of a dancing girl.

Skeletons of human beings, and some animals and skulls of men and graves have also been unearthed.

There we find stone weights of different sizes. Most of the smaller sizes are cubes of chert, first chipped and then ground to requisite weights. Some of the small weights are barrel shaped made of gray slate. The larger stone weights are conical. It is either furnished with a rim at the apex or pierced with a hole, for passing through a rope, for easier handling.

Script inscriptions on seals and pottery have also been recovered. So, it proves that the ancient Indus people could read and write, unlike most of the primitive races of the world of that age.

CAUSES OF THE RUIN OF MOHENJO-DARO

DILUVIAL action of the river Indus is believed to be the cause of the ruin of this pre-historic town. Had it been so, indications would have been left of violence of sudden flood to destroy an old prosperous town. There would have then been hundreds of dead bodies of men and animals and an abundance of wealth and property found out. For the same reasons, it could not be due to the out break of destruc-

tive epidemic diseases, or to any disaster like a violent earthquake. Fire would have left nothing but ashes. In these circumstances, we believe that the town was evacuated in a great hurry by the citizens, leaving behind some valuables, for fear of molestation and plunder by an advancing hostile army, during the latter part of the Copper Age. The old Indus people, thus, left the city and the country for good and emigrated across the dense forests of Central India, into Southern India. On receipt of the report of evacuation, the invaders might have changed their course of action and did not actually occupy the town, Mohenjo-daro, which was left to its fate. The invaders were probably the Aryan settlers. Thus, practically they became the sole masters of Northern India, that is, the whole of the Indus and the Gangetic valleys, which were to them, a world of seven islands (*dvipa*), of which, there is a hymn, recited in the ceremonies. Now they turned back and proceeded towards the lower course of the Ganges which passed through lands, more suitable, for agricultural pursuits.

THE ARYANS

ACCORDING to most of the European historians, the Aryans came to India, as nomadic shepherds, in the Copper Age, some time, between 2500 and 2000 B. C. From the hymns contained in it, the Rig-Veda, the oldest scripture of the Aryans, in Sanskrit, is supposed to have been composed, in the period between 2000 B.C. and 1500 B. C. Some of the hymns refer to matters of their earlier homes. Opinions differ regarding the original home lands, from where the Aryans came. They probably came from a country of plain lands, covered with herbs and grasses, suitable for grazing sheep, in a region where climate was cold, for, we learn from the Rig-Veda that the Aryans used to wear garments of *urna* (wool) which was not suitable for a warm country.

We learn also, that the new comers, the Aryans, met with a stubborn resistance from black skinned, flat-faced, snubnosed people of short stature whom they called Dasyua or Dasa, while they described themselves to have belonged to an honourable race, white skinned and tall, with oval shaped faces, and straight and well shaped noses.

The Aryans were the worshippers of nature. Fire (Agni, Vanhi), Sun (Sabitri or Surya), Indra (the god

of heaven and cloud), Yama (the god of death), Varuna (god of sea), Soma (moon, god of wine) were their chief deities. They invoked the deities by recitation of the hymns of the Veda, at the Yajna (sacrifice). They believed that the deities attended the Yajna and accepted all the articles offered to them, through fire and blessed the people. They burnt their dead bodies (1) and believed that their spirits would go to heaven after death, staying there happily with sages and gods. It appears that they were not believers of re-birth, otherwise they would not have invoked the souls of forefathers to participate in a yajna, particularly pitre-yajna. It may be inferred also that the pitre-yajna was believed to have given the souls all satisfaction and ridding them of the earthly attraction of re-birth. They were not afraid of death which was merely nature's law. There were no images worshipped by the Aryans.

The ancient non-Aryan tribes, viz. Mundas, Uraons, Bheels, Santhals, etc., of the present day, who live in the hilly countries, in Chota Nagpur, Central Provinces and Central India, used to offer food, goats, fowls, wine, etc., as they do still now, before the tallest tree in a lonely place in each village, believing that a ghost (*nad*) stays there. They believe that the dead become ghosts. Some of the ghosts turn to be hostile and some friendly. They recite slogans to invoke the ghosts and offer to them all sorts of food and drink to influence them to be favourable. They bury the dead bodies of their relatives as the Indus men did. The Indus people appear to have belonged to a distinct race who worshipped the image of Siva, believed to be the most powerful deity living in the Himalaya mountains. They were, perhaps, the ancestors of the Dravidians of South India. These people fought bravely with the Aryans to the last. Mohenjo-daro was probably their chief hold, until they retained it. It appears that Siva

(1) This method, cremation, was called Agni-dagdha in which the corpse after being washed and besmeared with clarified butter and curd, wrapped with cloths, was burned on the funeral pyre. There were two other methods ;(i) Casting out and (ii) the Exposure of the dead bodies to be devoured by beasts and birds, after going through the processes of washing, etc, as in the cremation. These were the prevailing systems for disposal of the dead of Vedic Aryans. In the later periods, the burning system alone had steadily grown into a general practice.

and Lingam were regularly worshipped there in the temples. The worship of Siva and Lingam was introduced by this pre-Aryan Indus people into Southern India. Latterly the Aryans, it appears, accepted Siva as one of their gods.

The Dravidian civilization commendably influenced Aryan society and their literature. Ultimately, the Dravidians were completely merged into the Hindu society and they now form a powerful section of the Hindu nation.

AGRICULTURAL PROGRESS IN ANCIENT INDIA

AS an agriculturist, the writer is most interested in agricultural products and implements discovered at Mohenjodaro. We notice, there are in the ruins, plough shares and muller and pestle, made of flint (a kind of hard stone), copper and bronze made sickles, saws, chisels, knives and razors, but no circular grinding stone.

Numerous spindles and whorls have also been unearthed. Some whorls are made of faience and those of common type, of shell. Of the grains, there are specimens of wheat, barley and edible date palm seed. The date seed is not of a genus of Phoenix found wild all over India, but of a true edible species (*Phoenix dactylifera*) cultivated in warm dry regions, from Senigal to the border of Sind.

A nation's civilization is measured by the progress made in the arts of agriculture and industry. The articles recovered from the ruins of Mohenjo-daro prove a standard of surprisingly great civilization of the people of pre-historic times who lived there, before iron was discovered.

It was believed that the Aryans had discovered the plough, but nomadic tribes are not likely to have discovered a plough and to have made use of it, although, they must have gained experience of food grains, edible roots, herbs, fruits, etc. in their wanderings. Occasionally nomadic men grow some crops by clearing forest grounds, in the process of dibbling, called *jume* cultivation, as done by some tribes in the hill districts, in the Chittagong Division, in Bengal and go away, after a year or two, in search of new lands.

THE PLOUGH

I

THE stone plough of Mohenjo-daro is, of course, of a rudimentary kind, not at all fit for breaking rough soils. Any how, it had been of greatest service to the primitive cultivators and surely it had been a long jump in advancement of world's civilization. The Aryan settlers must have got it from the old Indus people and readily put it to the test. It worked more satisfactorily, on the soft alluvial soils, in the Punjab, than on the hard soils of Sind. The Aryans were so delighted with the results that hymns were composed for the Rig-Veda describing the beauty of a straight furrow (*Sita*). This hymn on *Sita* might have inspired the immortal author of Ramayana, Valmiki, to write his celebrated book on Sita as the heroine and Rama as the hero, as suggested by late R. C. Datta of the Indian Civil Service. Perhaps the progressive Aryans, after the discovery of iron, effected improvements on the plough, introducing iron plough shares, in the body of the wooden plough. In this connection, we may trace some significant facts, from the two great Sanskrit epics, Ramayana and Mahabharata of the period, when the Aryans were settled down peacefully in the territories known as Aryavarta and absorbed in thought of philosophy.

Ramayana

King Janaka of Mithila, the greatest philosopher of the time, used to plough the land. In course of ploughing, one day, he got an exquisitely beautiful girl, on a *sita* a furrow, made by him. She was carried to the palace by the King and carefully brought up, as the king's own daughter. She was named Sita. In due time, she was married to the prince Ramachandra of Ayodhya who was then the most skilful bow man. He killed many terrible giants, when he was a boy of fourteen. Before ascending the throne, the prince had to go through an ordeal in which he had to pass 14 years as an ascetic, in the dense forest of Dandaka, in the Deccan. His gallant wife Sita and his youngest step-brother Lakshmana could not be persuaded to be left behind, in the palace. They followed the prince as ascetics. One day, in the forest, when both Rama and Lakshmana were out on hunting, the mighty giant, King

of Lanka (Ceylon), Ravana, captured Sita and disappeared on a flying chariot. Ramachandra gathered all the wild or semi-wild inhabitants of Southern India, round him. They constructed a floating bridge, across the straight, between the southern end of India and Ceylon, with wood, straw, stone and earth, in which even smaller animals like squirrels volunteered their services. Rama Chandra, then invaded Lanka and killed the King Ravana. The faithful Sita who was put into a prison, for her refusing to be a queen of the King Ravana, was rescued and they returned to Ayodhya in triumph.

Sita's joy knew no bounds when she was back, amongst her people, after a long period of fourteen years. But her happiness was to last for a few months only. The subjects of Ayodhya began to pass remarks, on the action of the king Rama in receiving back the queen who was kidnapped by the giant king Ravana. For the peace and prestige of the kingdom, Ramachandra had to order his beloved wife Sita to be banished to a forest. The devoted queen Sita received the order calmly, believing that her suffering was not yet over. In her exile, in the forest, she was fortunately given a fatherly protection, by the sage Valmiki, the poet of Ramayana.

When Sita was exiled, she was pregnant. In time, she gave birth to beautiful twin-sons who were well cared for by the sage and other inmates. The young princes finished the course of learning in all branches including arms, when they were twelve years old. At this time, king Ramachandra happened to perform the Horse-sacrifice Yajna. The sacrificial horse entered the forest where the princes lived. The princes caught hold of the horse. The king's soldiers, at first, tried to persuade the boys, supposed to be the sons of the sages of the forest, to part with the horse; but they would not yield. As a result, there was fighting. The king's soldiers were defeated. The news reached Ayodhya. The king and his courtiers hastened to the spot and they were all struck at the bravery and the skill of the young warriors. On enquiry, they came to learn that the young warriors were the King's own sons who were living there with their mother Sita at the place of the sage Valmiki. The king duly paid respects to the sage and saw Sita. The king entreated Sita to return to the palace, but she respectfully declined.

After handing over the charge of her sons to the king, she dropped to the ground and departed from this world.

To all orthodox Hindus, the Ramayana is a true history and to Europeans, it is an interesting story. We may be excused, if we suggest it to be a most interesting book, on philosophy, to teach the truth of endurance and sacrifice on one side and to show wealth, luxuries and power of temporary existence, on the other, in which the plough played an important part of far reaching effects.

Mahabharata

In Mahabharata, the plough is a sacred implement which is supposed to have been the symbol of truth and duty with the prince Balarama, the elder brother of Sree Krishna, the author of Gita philosophy. He is described as a champion of ploughmen. He would never go away without a plough.

The Mahabharata narrates, in simple Sanskrit language, stories of numerous characters produced to teach us how to attain the highest ideal of man and woman, for the world's peace and happiness. The principal story of Mahabharata is a conflict between the two sections of Kaurava family of Hastinapur, in the Punjab. Dhritarashtra was the head of the family. He had one hundred sons who were all for wealth and power. Dhritarashtra was described to be blind, so he could not succeed to the throne; yet every minute account of the kingdom and that of the family was known to him. According to the rules, the kingdom was inherited by Yudhishtira, the eldest son of the dead younger brother of Dhritarashtra. Dhritarashtra apparently bore no grudge against Yudhishtira and his four brothers, but the blind prince did not effectually check his sons, from their setting up plans cunningly, one after another, to ruin their cousins, to get possession of the Kingdom. Persuasion or arbitration was of no effect even to grant Yudhishtira and his four brothers five villages. Ultimately a fierce war broke out. On Yudhishtira's side, there were all right thinking bold princes of India and on the other side, there were all powerful and wealthy kings and their dependants. Sree Krishna who was adored as the greatest preacher of the truth of Gita, was Yudhishtira's guide, while his elder brother Balarama

the greatest champion of plough and agriculture remained neutral, suggesting perhaps, that the duty of the growers was to feed all persons whether they were friends or foes or good or wicked. In the battle field, Sree Krishna preached the religion of his *Gita* to Arjuna, the third brother of Yudhishtira, who was one of the greatest warriors of all the combatants. Sree Krishna explained that duty was above all and dearer than one's own life, when Arjuna was found to have been faltering on the battle field being afflicted to think of fighting and slaying his own kinsmen. Sree Krishna reasoned with Arjuna saying that he would be a coward who would fail to do his duty. Ultimately the war ended in destruction of all forces, on both sides. Not a single combatant turned back. Yudhishtira and his brothers and the blind Prince were the only survivors. Yudhishtira then established an ideal kingdom.

It might be noted that in the battles of Kurukshetra, it appears that some instrument containing some destructive inflammable substances was invented and applied. It is said that Arjuna the General of Yudhishtira's army got this weapon from Indra, the god of sky. The Ramayana also tells that Indrajita the eldest son of Ravana had obtained a weapon like that of Arjuna from Siva with which he had defeated Indra, the king of heaven.

THE PLOUGH

II

REFERENCES to the Rig-Veda point out that as soon as the Aryan invaders established a colony in the Punjab, they had taken to agricultural pursuits in right earnest, in addition to their rearing of sheep and cattle. Cattle were yet then their wealth, *dhana*. In the opinion of the famous Sanskrit scholars, Macdonell and Keith, in their Vedic Index, the Aryans had already attained some proficiency in ploughing of lands, before they had been separated from their Iranian brethren, as indicated by the identical words, Sanskrit *kṛṣi* and Iranian *kṛso* denoting ploughing. In later Sanskrit *Karsanam* denotes ploughing. There are numerous names for the plough and ploughing in the Rig-Veda of which *langala* and *sira* denote a plough, and *phala*, occasionally *stega*, indicate plough shares and *sita* a furrow. *Sila* is another

name for plough in Kapisthala Samhita denoting that plough was originally made of stone.

It appears that the ancient Indo-Aryans had very heavy ploughs, for we learn from the Rig-Veda that the ploughs were drawn by 6, 8, 12 even 24 oxen, unlike the ploughs used by the Mohenjo-daro people. The Mohenjo-daro stone plough, as has been recovered, is like an ordinary wooden plough of the present day Sindhi plough. The Aryans must have effected great improvements to the plough from whatever country they had originally obtained it. If the Aryans had got the original plough from the Mohenjo-daro Indians, in the early Vedic period, the Iranians might have afterwards secured one from their Indo-Aryan kinsmen.

IRANIAN AND INDO-ARYAN

ACCORDING to the opinions of the European historians, the Indo-Aryans had left behind the Iranian section of their kinsmen and moved further off towards India, in search of new pastures. In this connection, we might refer to a well-known mythological story contained in the Mahabharata and some other *Purans* (epics) which runs as follow :

Kashyap was a great sage who begot *Dathyas* also called *A-Shuras*, through his wife Dithi and *A-dithyas* or *Shuras* (*devas*, gods) through another of his wives A-Dithi. Dithi and A-Dithi were sisters. They were all diligent people of super-natural power, but the *A-Shuras* differed from the *Shuras*, in their behaviour towards others. They were of violent temper, while the *Shuras* were polite and pious. This made the eldest son of A-Dithi, Indra, the king of heaven. Dithi's sons could not tolerate it. Before long, fierce fighting ensued, between the two sections of the family. The war continued for a long time, in which both the parties suffered severely. At the end, the *Dathyas* were defeated and driven out from heaven.

If there was any truth, in this story, it may be suggested that the defeated *A-Shuras* retreated to Persia where they founded a new powerful State, named Iran, derived probably from the word *Arya*. In that case, it is most likely that the Aryan settlers had obtained their original plough from Mohenjo-daro rather than from anywhere else.

Furthermore, there are some important names of articles which are mentioned in Atharva-Veda, not in Rig-Veda, but they are either identical, or the very same, both in Sanskrit and Persian tongues. It suggests that these two branches of the Aryan race were, at least, very closely connected, with one another, till the times of Atharva-Veda.

IRON AND ABORIGINAL TRIBES

NOW we turn to the question of discovery of iron, in ancient India. The ruins of Mohenjo-daro do not give us any information on the point, because they relate to pre-iron periods. Rig-Veda does the same (vide Vedic Index of Names, Macdonell and Keith). There are frequent references to it, in the period of Atharva Veda and the epics. In Ayur-Veda, which is considered to be a supplementary part of Atharva-Veda, when medical science was far advanced in India, iron was largely used by the Aryan physicians. In Susruta, we find not less than a hundred iron instruments of different shapes and tempers used for surgical purposes and iron was also used medicinally. It is difficult to say by whom and when iron was first obtained, and in this connection, we may refer to the iron which is still manufactured and used by the aboriginal tribes of Chota Nagpur.

The Uraons and the Mundas are still to be found in the deep forests of Chota Nagpur. I happened to have been living with them, for nearly six months, in 1924, in a forest, within the jurisdiction of Jospur State, C. P., at a place called Sarup-comb, situated at a distance of 100 miles north from Jharsuguda (Sambalpur) B. N. Ry and 150 miles south from Daltanganj, E. I. Ry. What I learnt of them is noted briefly:—

They live chiefly on rice, wild roots and herbs. They eat the flesh of almost all wild animals killed by them. They also take the flesh of domesticated animals, such as cow (called *wa*), bull or bullock (*adda*), buffalo (*mankha*), goat (*era*), pig (*kichhi*), fowl (*kher*), horse and sheep. For the last two, the Uraon people have got no names, in their own tongue. They take fish (*injo*), when available.

Dead bodies of domesticated animals are also eaten by them. Rice (unhusked rice called by them *he-chhe*, husked rice *tihil*, cooked *mandi*) is their principal food.

Next to it, are millets such as *Kodoi* (in Hindi *marua*, in Sanskrit, *ragi*) and *goorlu* (Hindi *gondli*). They have no names of their own for wheat, barley, mungoe, rahar, gram, etc. They have now in use the Hindi names of these crops. For Kulthi, they have their own name as *arachga*. Their cloth (*Kechri*) is woven with thread (*mer*) of Cotton (*Kapshi*), by the people themselves. A piece of that for a man, about 8 ft. long by $1\frac{1}{2}$ ft., in width, does not fully cover his waist and while that of a woman is about 6 ft. long by $2\frac{1}{2}$ ft. wide, hardly reaching her knees, with another piece to cover her breast.

They never grudge any body's fortune nor deplore their own miseries. They are hard working, industrious and peace loving people of no ambition.

Child marriage is unknown among these tribes. Maids select their husbands. The married couple get a pair of bullocks, one plough, some seeds and some lands from the bride's parents. Usually they live close to the house of the parents of the bride

The *Uraons* or the *mundas* use a kind of plough (*ugata*) made by themselves. The plough is made of a piece of strong wood of *bandhan* tree (a Hindi word) flattened with an axe (*tange*) to which, a piece of flattened iron, about 1 ft. long and 2" broad, sharpened on both ends, called *ushang*, is attached to cut the ground.

Whatever might have been the position of the ancestors of the *Uraons*, *Mundas*, *Bheels* and *Sonthals*, in the primitive ages, they were probably the discoverers of iron, in India. Iron is found in a natural state, as black dust, on the hill sides, all over Chota Nagpur. It is not met with, on alluvial tracts, on the basins of the *Indus* or the *Ganges*. Iron is still manufactured by these aboriginal tribes, in their own way, from the black dust of iron deposited on level grounds, below hills. The dust is carefully collected and heated till melted, together with a mixture of charcoal, over a furnace about 2 ft. in height and 1 ft. in diameter. This furnace is kept alight by blowing both with a sort of skin bellows and bamboo blowing tubes. The matter, containing impurities which is lighter than iron, overflows through a side-opening of the furnace, leaving the iron behind. The iron is then removed and hammered, on an iron anvil and again heated as before with charcoal. This process is repeated 4 to 5 times, until almost pure

iron (*panna* in Uraon) is obtained. The instruments and the weapons, commonly axe (*tange*), sharp edged *ballu* (*farsha* in Hindi), arrow points and plough shares are still prepared by these aboriginal peoples. I have got such a *tange* and a *farsha* in my possession, since 1924. They are in very good condition and they are almost rust free. The earliest Sanskrit name for iron is *ayasam*. Perhaps the name *usang*, the iron that was used as a ploughshare, by the ancestors of the Uraons, Mundas, etc., is derived from Sanskrit *ayasam*, the name given to it, by the Aryans.

Ahan is the Persian name for iron, Tamil name *irumbu* and Telegu name *inamu*. Thus it appears that the Uraon and the Sanskrit and the Persian and also the Dravidian names are all identical. We might also compare here some of the European names for iron, as, *iren* in old English; *iren*, *isen*, *isern* in Anglo Saxon; *isarn* in old Saxon; *isarn*, *isan* in old High German; *eisen* in German; *iarrann* in Irish, (vide the word iron in Webster's Dictionary).

The similarity of the names of iron, in different tongues of different countries, with the exception of the Latin word *ferrum*, suggests that they are derived from the Aryan name *ayasam*.

If the Indo Aryan settlers had known iron, before they had settled in India, they must have had carried with them some of the iron instruments, tools and vessels of common use. But there is no proof that the Aryans had got with them any of the iron articles.

There is, however, a section of Indian scholars who believe that the early Aryan settlers in India knew iron and they made use of it (vide Dr. Panchanon Niyogi's articles on iron and copper in ancient India). Dr. Niyogi is also of opinion that copper or brass were not known to the Aryans when they came to India. In his view, the Copper stage of civilization followed the Iron-stage, in India. Dr. Niyogi's reasoning is not convincing to us, for the simple reason, that the Aryan societies from the beginning of the introduction of *pitre-yajna*, down to the present, do not offer iron materials in the Sacrifice, while there are plenty of vessels made of copper, brass and bronze. The old Aryan families did not forget even the negligible *kush* grass which was to them most useful in the earliest period of their settlement, it is unlikely, that iron the most important of the metals could have been omitted or neglected.

Dr. Niyogi's argument does not stand also, on the ground, that the Mohenjodaro excavation has unearthed various kinds of copper and bronze made articles including tools, implements, images, etc., in addition to those of stone; but iron goods have been totally absent. Considering all these points, it may be suggested that in ancient India, iron was discovered by an aboriginal tribe, during the period, when Atharva Veda was composed, and the Aryan settlers got it from this tribe and distributed the metal to other countries, under the name *ayasam*.

In this connection, it may be added that in the Rig-Veda, when the word *ayas* was used, it denoted a metal, probably bronze, (Macdonell and Keith). In the Atharva-Veda, the word *ayas* was used for iron. Similarly the word *loha* or *lohita* denoted copper in the Vedas, but, afterwards, when iron could be so purified as to make it a red substance, was exclusively used for iron. In the oldest Hindu Medical books, Susruta, Charaka, etc., *loha* or *louha* denoted all metals, viz, gold, silver, copper, brass, iron, zinc, tin, lead, etc. But there was also other particular name for a particular metal.

Going through all these circumstances, we believe that iron was discovered during the period of Atharva-Veda by the hilly tribes of Chota Nagpur and it was brought to the notice of the Aryans who gave it the name of *ayasam* and this aboriginal community adopted the Aryan name of *ayasam* as *ushang*. *Syama* is another Sanskrit name for iron in the Atharva-Veda. Probably this name was not so popular as *ayasam*. *Syama* denotes that iron is a black substance.

Deposits of iron ores in one or other forms exist, to a more or less extent, all over India, containing iron, on an average, 30 to 70 percent, conspicuously in the Central Provinces, Central India, Chota-Nagpur, Bengal, Orissa and Madras. The cultivated high lands, in the Chota-Nagpur Division, contain usually 20 per cent of iron. The black iron dusts of Chota Nagpur probably contain more than 80% of iron.

WHEAT AND BARLEY

AS regards the antiquity of wheat, barley, edible date seeds and specimens of cotton found in the ruins at Mohenjo-daro, Sir John Marshall is of opinion that these crops were extensively cultivated at Mohenjo-daro, during

pre-historic times, long before the Aryan settlement in India, and that wheat (*Triticum sativum*, race *compactum*) and barley (*Hordium vulgare*) formed the chief food grains of the population of the City. Specimens of these seeds were found scattered, in a badly carbonised state, in the upper strata, about 5 or 6 feet below the surface and some of the barley grains and glumes of wild type (*H. distichon*) adhering to a sun-dried brick, at the lowest level. The edible date palm seeds were found in the upper strata, also in a carbonised state.

It is true that the samples of wheat and barley seeds of the same types, as those of Mohenjo-daro, have been recovered from the pre-dynastic graves in Egypt, dated about 3350 B. C. but from the condition, in which the samples were lying at Mohenjo-daro, question might arise as to whether it was not possible that the seeds of some later period might have been carried downwards from the surface, through cavities. Diluvial action would have totally destroyed the seeds, either by the flowing movement of water or the action of fermentation set up afterwards. In the Rig-Veda and also in the religious ceremonies of the Aryan settlers of earlier periods which are still continued, such as *Pitre Yajna* (*Sradh*, sacrifice for the peace and salvation of the departed souls of fore-fathers), when all sorts of known articles of food, drink and comforts are offered, wheat is not mentioned or used. They offer to the departed souls of parents, fore-fathers, sages and gods, sesamum, barley, *tandula* (husked barley or rice) *gram*, *mungoe*, meats both cooked and uncooked, fruits, flowers, honey, sugar, scents, pure water, milk, wine, *ghrita* (butter), beds, bedsteads, wool, woollen cloths, woollen seats, sticks, umbrellas, shoes of hide, chariots, including horses, cows, bulls, elephants, sheep, silver, gold, utensils of copper, brass or bronze,* tusks of elephant and boar and many other things known to the ancient Aryans. Evidently wheat was unknown to them. Had it been otherwise, they would have readily introduced into their colonies a crop like wheat of unsurpassing importance. In later periods, when they had got it, quickly it was brought under cultivation and was most appreciably named as *godhuma*, *bahudugdha* (much milky), *rashala*

* Brass or bronze is each an alloy of copper. Brass contains $\frac{1}{2}$ copper and $\frac{1}{2}$ zinc, (*yasoda* in Sanskrit) and bronze contains about 8 parts of copper and 1 to 2 parts of tin (*trapu* or *vansa*) called *Kangsyaka*.

(tasteful), *shu-mana* (good hearted), *apuppa* (grain for cake) and also *yabana*, *yabana-prya* indicating that it was obtained by them from a *yabana* country, Arabia or Turkey. The Persian name for wheat is *Gundum* which is exactly identical with the Sanskrit word *Godhuma*. Probably, the Iranians got it from the Aryans. If wheat was known to the Indo-Aryans, before they had been separated, from their Iranian kinsmen, the crop would have been surely mentioned in the Rig Veda.

The words *sradha* and *pitre-yajna* are not found in the Rig-Veda. This ceremony was probably introduced in the later period, originating perhaps from the hymns which define the position of fathers (*pitarā*) towards sons and that of sons towards fathers. Father was believed to be equal to Fire and Indra was greater than the father denoting that anything offered to Fire or Indra would satisfy the fathers. In some other hymns, *Yama* was believed to take charge of the souls of the dead. Hence these three deities are specially invoked to accept offerings of all sorts of food, drink and other comforts, for the sake of eternal peace of departed souls. In the ceremony, all the procedure of the sacrifice in the Vedas is observed. Any article, offered in the ceremony, is believed to have been in existence, since the times of the Vedas. So, as wheat is not offered in the ceremony, it was not known, in the early Vedic period. In Sanskrit *godhuma* sometimes denoted corn (maize.)

Wheat is called in Arabic *kurpas*, in Tamil *godu-mbi* in Telugu *godumalu*, in Hindi *gohum* or *gohu*. It is most likely, that the Dravidian names *godumbi* or *godumalu* are derived from the Sanskrit word *godhuma*. The term *godhuma* occurs frequently in the Susruta's Hindu medical work which is supposed to have been written about the 8th century B. C.

The Telugu names for barley *Yava*, *Yavaka* are the same as the Sanskrit names. The other names for barley in Telugu are *dhanya bhidam* and *barle biyam*. *Dhanya* is a general term, in Sanskrit, for all grains deriving from *dhana* (wealth). Tamil name for barley is *barli arisi* or *barli arishi*. The Hindi name is *Yav* similar to Persian name *Yao*.

Although the Uraons, Mundas and Sonthals are supposed to have belonged to a distinct race, it may be presumed, that these tribes must have come in contact with the civilized

people of Mohenjodaro who had settled in Sind a long time, at least 1500 centuries, or more, before the Aryan invasion, if they (Mohenjo-daro Indians) had, at all, migrated to India, from any other country. The aboriginal tribes and the Mohenjodaro colonists must have been living peacefully, all this time forgetting, enmity if there had been any, in the beginning among the ancestors of these races. In these circumstances, there is little doubt that the aboriginal tribes, that is, the Uraons, Mundas and Sonthals would have had the seeds of such important crops like wheat, barley, cotton, from Mohenjodaro and adopted the names given them by the growers of Mohenjodaro. There is nothing of this kind. On the other hand, we find these aboriginal tribes have been cultivating wheat, barley etc., giving them the Aryan names, while the Dravidians also adopted the names of the Aryans. For reasons given above, we are inclined to suggest that the pre-historic people of Mohenjo-daro had not known wheat or barley, if they were the ancestors of the Dravidians. The Dravidians probably got these grains (wheat and barley) from Aryan sources. We believe *Ragi* (Sanskrit name), *Eleusine coracana* a millet which grows all over India, both cultivated and wild, was the chief food grain of the Mohenjo-daro people. It is still the most important food grain of the peoples of Southern India and of all aboriginal tribes. It is called *kevir* in Tamil, *sodi*, *ponassa*, *kawaru* in Telegu.

RICE

RICE was perhaps not known to the old Mohenjo-daro people, because this area of the country was extremely dry and naturally un-suitable for it to grow there, without good irrigation. In old Sanskrit, *brihi* is the common name of rice and the *dhanyam* denotes any food grain. *Brihi* is therefore *dhanyam*.

There are chiefly three classes of *brihi* in Sanskrit, frequently mentioned in Susruta, and also in the Rig-Veda. They are as follows:—

1. *Sashtika*—Summer rice which ripens in sixty (*sashty*) days in the summer.
2. *Brihi*—autumn or early rice which ripens in the autumn months.

3. *Shali*—late or winter rice which ripens just in the beginning of the winter.

Ori or *orika* is the Sanskrit name of wild rice. Probably the name is derived from the word *urupa* a floating raft. The long stems of *ori* rice really form a raftlike structure, floating from one place to another, on the rise of flood water. Ripe seeds often shed on the raft and germinate in the next summer. Poor people collect the seeds very carefully, before they are fully ripe, otherwise the seeds would be lost, as they are apt to fall down easily. It grows on marshy lands, all over India, particularly in Bengal, Orissa and Madras. In Susruta *ori* or *orika* is also used as the name for all rice. The Latin word *oryza*, most probably, comes from the Sanskrit *orika*. There are various colours and shapes of the grains and husks of both the wild and the cultivated rice in India. Most of the races are bearded and some are beardless.

The Dravidian words for rice are *arisi* in Tamil, *Uri*, *Cheni* and *mata-karulu* in Telegu and *bhatta* in Kanarese. It is called *sari* in Sind. The Telugu name *uri* and the Tamil name *arisi* are possibly derived from the Sanskrit *ori* or *orika*. *Uri* is the name of wild rice both in Bengali and Hindi. The Dravidians probably discovered rice in the Deccan and some sections got it from the Aryans. Therefore different names for rice are used in the Dravidian tongues.

Virinze, *virinza* or *birinj* are Persian words for rice, which are identical with *brihi* in Sanskrit as stated in Sir George Watt's Dictionary on Economic Products. This authority points out that rice was known to the early Aryans when the two branches lived together. *Shali* is another name for rice both in Sanskrit and Persian.

Although rice was well known to the Indo-Aryans, yet, it seems, no serious attempt was made to cultivate it, in their earlier settlements, in the Punjab, where they wanted the crops which could be grown more easily and more quickly. Barley was then their most favourite food crop. To them, it was the prince of grains. In the later period when their colony expanded, along the flooded lower course of the Ganges, rice formed their most important food grain, so much so, that the name *dhanyam* was exclusively given to it.

Not only were there numerous races of rice, under cultivation, in the period, when Susruta's great work on medicines was composed, there were also known various methods of cultivation of the crop which we see now. Susruta described the qualities and properties of different races, cultivated on different soils and under different methods. We find there were broadcasting and transplanted crops. There was also a crop from the offshoots of the stocks, left on the ground, after cutting.

SACRED KUSH GRASS AND SESAME SEED

KUSH grass and sesame seeds were most sacred, to the Aryans. In all religious ceremonies, water, touched with *kush* and sesame seeds, is sprinkled all over the place and the articles to purify them.

It is perhaps, in recognizance of those apparently negligible small things, which were found to have been of unforgettable help to the wandering people, at their journey's end or at the time of their being engaged constantly, in wars with their opponents, in India. They had *kush* grass in abundance where-ever they had encamped, with which they very easily prepared mats and temporary huts and beds. *Sesame* seed was found to grow everywhere easily and quickly which yielded them an article of both food and oil.

COTTON

IN regard to the specimens of cotton fabric found at Mohenjo-daro, we learn from Sir John Marshall's records (vol. 1 Chapter IV-P 32) that there are "A few minute scraps found adhering to the side of a silver vase" which have been subjected to an exhaustive examination by Messrs. A. N. Gulati and A. G. Turner of the Indian Central Cotton Committee, Technological Laboratory. They are of opinion "The Cotton resembles the coarser varieties of present day Indian cottons and was produced from the plant closely related to *Gossypium arboreum* or one of its varieties. It is quite unlike the present day American Cotton (*Gossypium hirsutum*) or any of the finer varieties. Its typical convoluted structure proves this Indus Cotton

could neither have come from wild species such as *Gossypium stocksii* found in Sind today which has no convolutions." Mr. Turner adds also that the fragment of the cloth was "So small that it was exceedingly difficult to attain certainty", although, he for himself does not entertain any doubt about the correctness of the view expressed above.

From what is recorded, in the above mentioned remarks of Sir John Marshall and the experts, it would be difficult for us to believe that cotton was so extensively cultivated in Sind, as to supply the people of Sind, even partially with cotton garments. We are inclined to make this comment for the reason that, in the Rig-Veda-which is supposed to have been compiled about 1500 B. C., that is, about 500 years after Aryan occupation of Northern India, there had been no mention of cotton. They had then garments of wool only, known as "vasha" which was defined as *urna moyang vasha* that is, the "vasha", cloth, made of *urna* (wool). They also used both skins and blankets to cover their bodies. Evidently the Aryans found it uncomfortable to wear woollen garments, during the hot weather, in India. They were in search of some, garments of some other fibres for their use, during this weather. So, we find that they had afterwards discovered silk, the fibres of sunn hemp and flax and latterly cotton, also some other *tantu* (fibre) which cannot be identified now. From the scriptures compiled after Rig-Veda, when the caste system was being in formation or established, the threads and garments made from sunn hemp, flax (*kshuma*) and cotton (*karpashi*), also silk (*kowsheo*) were reserved exclusively for the use of the two higher castes of the Aryans, that is, the Brahmins and the Kshatryas. The Vaisya caste, a section of the Aryans, who were engaged in agriculture, industry and trade were not even allowed to use the above mentioned fibres. They were to use wool. If cotton were plenty, in Sind, when Mohenjo-daro was in flourishing condition, it would have come to the knowledge of the diligent Aryans. The Aryans had probably got the cotton later from the hilly aboriginal tribes of Chota-Nagpur, as we have already referred to. The Sanskrit name for cotton "Karpashi" might have been derived from the Uraon name "Kapshi." The "minute scrap of Cotton" discovered at Mohenjo-daro might have been carried down, in some later period, through the action of percolation of rain water, through cavities or cracks.

The Tamil name for cotton is *semiaruthi* and Telugu name *patti* and the Santhal name *kaskom*. In Persian, it is called *pumbah qutn*. So, there is no doubt, that the Aryans got cotton from the aboriginal tribes of Chota Nagpur who still grow *Gossypium arboreum*.

As we said before, the aboriginal tribes must have had been in contact with the Mohenjo-daro people, for they had been living peacefully, side by side, for over a thousand centuries, when the Aryan settlement in India commenced. It was natural, then, that if the aboriginal races would have obtained cotton from Mohenjo-daro, the Uraon name and the Mohenjo-daro name of cotton would have been identical, derived from the word *kapshi*. As, the Dravidians are supposed to be the descendants of the Mohenjo-daro Indians, then, the Uraon and the Dravidian names should have also been similar.

The terms *patti*, Telugu name for cotton and *semiaruthi* Tamil name which are perhaps derived from Sanskrit *patta* (a synonym for cloth, or thread) and *salmali* (silk cotton), respectively, indicate, that the Dravidian peoples had introduced cotton into the Deccan from the Aryan possessions, through different sources. So, it proves, that the cotton was not known to the ancient Indus people, if they were the ancestors of the Dravidians.

Cotton is a one year crop. It is difficult to grow, in regions where rainfall is scanty, unless a commendable system of irrigation can be established, and where rainfall is heavy. This is the reason that it could not have been successfully grown, in the Aryan territories, for centuries, since it was known to them. Susruta the earliest Hindu Medical authority appraised cotton cloths for babies and sick persons and also for bandage in preference to flax or silk or woollen cloths. It appears that there was a great demand for cotton goods, but the supply was far short, even when Manu's Scriptures were composed (2nd or 3rd century A. D.).

It may be noted that *bhanga* (true hemp), flax and sunn hemp were mentioned as the medical plants in the Atharva Veda. The intoxicating property of *bhanga* was well known to the Vedic Aryans. Any yarn from bast fibre was not yet known. Atharva Veda mentions, however, silk garment; but there is no mention of the cotton plant.

We, however, definitely learn from Theophrastus (350 B. C) who writes that Indians made cloths from the fibre of a kind of small trees which were set in rows in the plain fields. He also says that the trees had leaves resembling those of mulberry. Herodotus (450 B. C), on the other hand, had written that India had wild trees which produced fruits bearing fleece. Probably the fleece mentioned by Herodotus was true-cotton, although he described it to be a wild cotton.

Flax And Bhnaga

The words *atashi*, *uma* and *kshuma* denoting flax are mentioned in Panini (900 B. C.). the oldest Sanskrit grammar. Some writers, however, confuse us to say that *kshuma* denoted silk. Other synonyms, in later Sanskrit, for flax, are *kshoumi*, *mada-gandha* (for fleshy smell of the flower and the seed), *nila*, *nilika*, *su-nila*, *nila-pushpika* (bearing blue flowers), *pichhila* (slippery), etc., which prove that *kshuma* is not silk but flax. Another name for *kshuma* was *sana*. It is here really confusing; but when *sana* denoted sunn-hemp, it was also called *pitha-pushpika* (yellow flowering). *Bhanga*, the true hemp (*Cannabis sativa*), was also called *sana*. Thus it appears that in old Sanskrit, *sana* was the common name for all bast-fibres, just as at present, *pat*, *pata* or *patua*, is the common name for all the fibres produced from the bark.

The flax and the sunn hemp fibres were perhaps discovered by the Aryans in the period following the Atharva Veda and the true hemp (*bhanga*) afterwards, some time, in the beginning of the Christian era.

In Bengali and Hindi, lin-seed is called *masina* (from *mashrina*, smooth), *tishi* and *chikna* (smooth), in Tamil *alshi*; in Telegu *atashi*; in Kanarese *agashi* and in Marathi and Gujarati *alshi*; Persian names *kattan*, *bazrak*. It will appear that the present Indian common names for lin-seed are derived from *atashi* which is denoted as *kshuma* by Panini.

Other Fibres

Susruta mentions different cloths and threads used for different purposes. In this list, we find *kshauma* (adjective of *kshuma*), *sana*, (sunn-hemp) *karpasha* (of cotton) and *abika* (woollen), *kousheo* (silk, *quasab* in Persian) *vashtram* (cloth) and *shutram* (thread). We also find silk cotton

of *salmali* (*Bombax* tree) and *arka* (*Calotropis*). There are also cloths of *patta*, *dukula*, and *patra-urna* (we can not identify), *chin-patta* (probably the cloth made of *rhea* fibre introduced from China), skin and strings from different barks. Susruta describes also the medical properties of the roots, barks, flowers and seeds of these fibre yielding plants. Manu advises different materials to be used for washing different cloths in which *kousheo*, *abika*, *kshouma* and *angsu-pattam* are mentioned (Chapter 5—120). *Angsu-pattam* was the cloth probably made from the true hemp. So *kshuma* is undoubtedly flax, not silk. Its importance, as the most esteemed fibre yielding plant, in ancient India, is no longer existing, since cotton has been successfully introduced as a field crop. Now it is entirely grown for the seed.

Sunn Hemp

From the Sanskrit literature, as already observed, the *Sana* plant and its fibre were known to India from the most ancient times. In Sanskrit, it is called *sana*, *sana-ghantika*, *piṭha-pushpi*. In Bengal and Northern India, it is known as *san*, *sanai*, *sani*; in Gujarat *san*; in Maharashtra *tag*, *san* and in Madras *sanal*, *janamu* or *sanavu*. All the names indicate that they were derived from the word *sana*. The Persian name for it is *risha-i-kanab*.

Hibiscus

Another important fibre crop of the present day is *Hibiscus cannabinus* called *mesitha-pat* or *mesot* in Bengal; *patua*, *kudrum*, *channa*, *amla-patua* in Bihar and Chota-Nagpur; *ambari* or *ambadi* in Bombay, *gogu*, *pulicchai* or *pundi* in the Deccan. Although it grows well, in all parts of India, either on high lands or low lands, it is not found anywhere in a wild state. Hence, it is supposed to have been introduced into India, from Africa where it is indigenous. There is another species, *Hibiscus Sabdariffa*, the *Rozelle* of the West Indies, widely cultivated in India, for fibre and also for fruit eaten in the form of jellies or chutnies. The leaves are also eaten as chutny. It is not strange, then, that they have no Sanskrit names.

Jute

Jute is first mentioned, in Susruta, as a pot herb and medical plant, under names *nari*, *nariha* or *nalita*. There

is no mention of its fibre in Manu. We find no references of its fibre, in any of the modern works, prior to the Ain-i-Akbari (1590) in which *lat* (sack cloth) is mentioned. There is no certainty, whether it was made from jute or sunn hemp. In Northern India, *lat* or *gun* is still manufactured, by hand loom, from sunn hemp, the cheaper quality from *Hibiscus* fibre. Any how, in our opinion jute fibre is extracted and used for string, rope and chat (sack cloth) in Eastern and Northern Bengal where it grows easily, in all classes of lands, for not more than three or four centuries.

The question, then, arises, if there had been no cotton, what had the civilized Indus people of Mohenjo-daro used as their cloths. In the earliest periods of civilization of the world, wool was the chief fibre for making garments, while the less civilized peoples used barks or leaves of trees to cover their bodies. The more civilized people of hot countries might have discovered some bast fibres in addition to fleece. There was perhaps sunn hemp. In Manu's Scriptures and in Susruta's Medical book there are mentions of silk, flax, sunn hemp, cotton and some other fibres which cannot be now traced or identified. Any how, the discovery of some scattered seeds and a few minute fragments of cotton fabric can hardly be taken as a precise proof that it was under cultivation and that it was in general use, when Mohenjo-daro was prosperous.

CONCLUSION

LEAVING aside the arguments put forward for and against certainty of the crops which are said to have been under cultivation in the neighbouring places of Mohenjo-daro, the historical value of the excavations is invaluable. It definitely proves that India attained a great civilization, in the prehistoric period, dated about four thousand centuries B. C. From the cultural side, the ancient Aryan civilization is regarded to be of unsurpassing value to the world. Indo-Aryan civilization as a whole, is a wonderful amalgamation of almost all the diverse races of men and the religious faiths of the world, including even atheism, as if the world meets in India; and India returns to the world a universal religion of devotion and duty in which every one's faith is respected.

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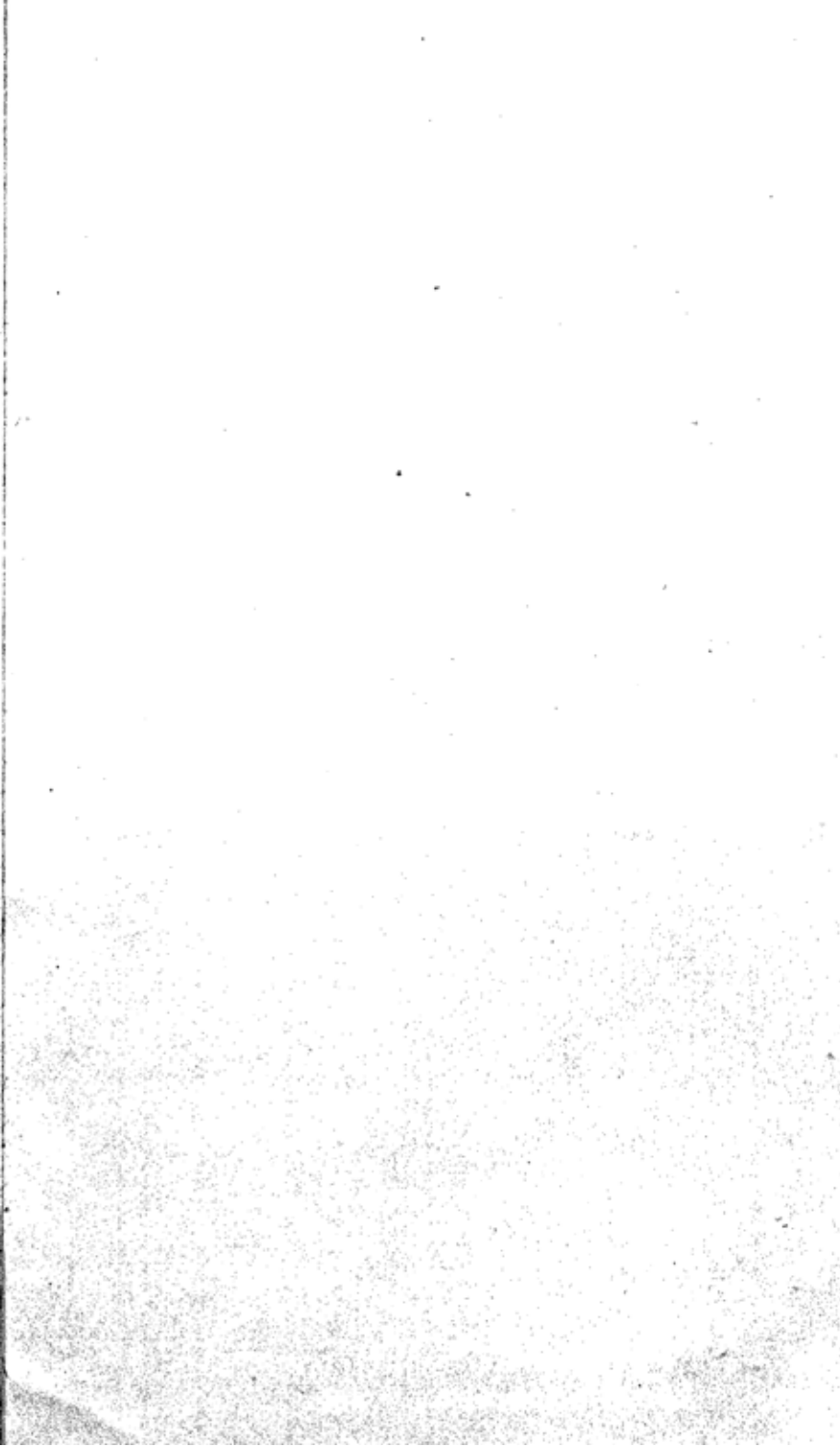
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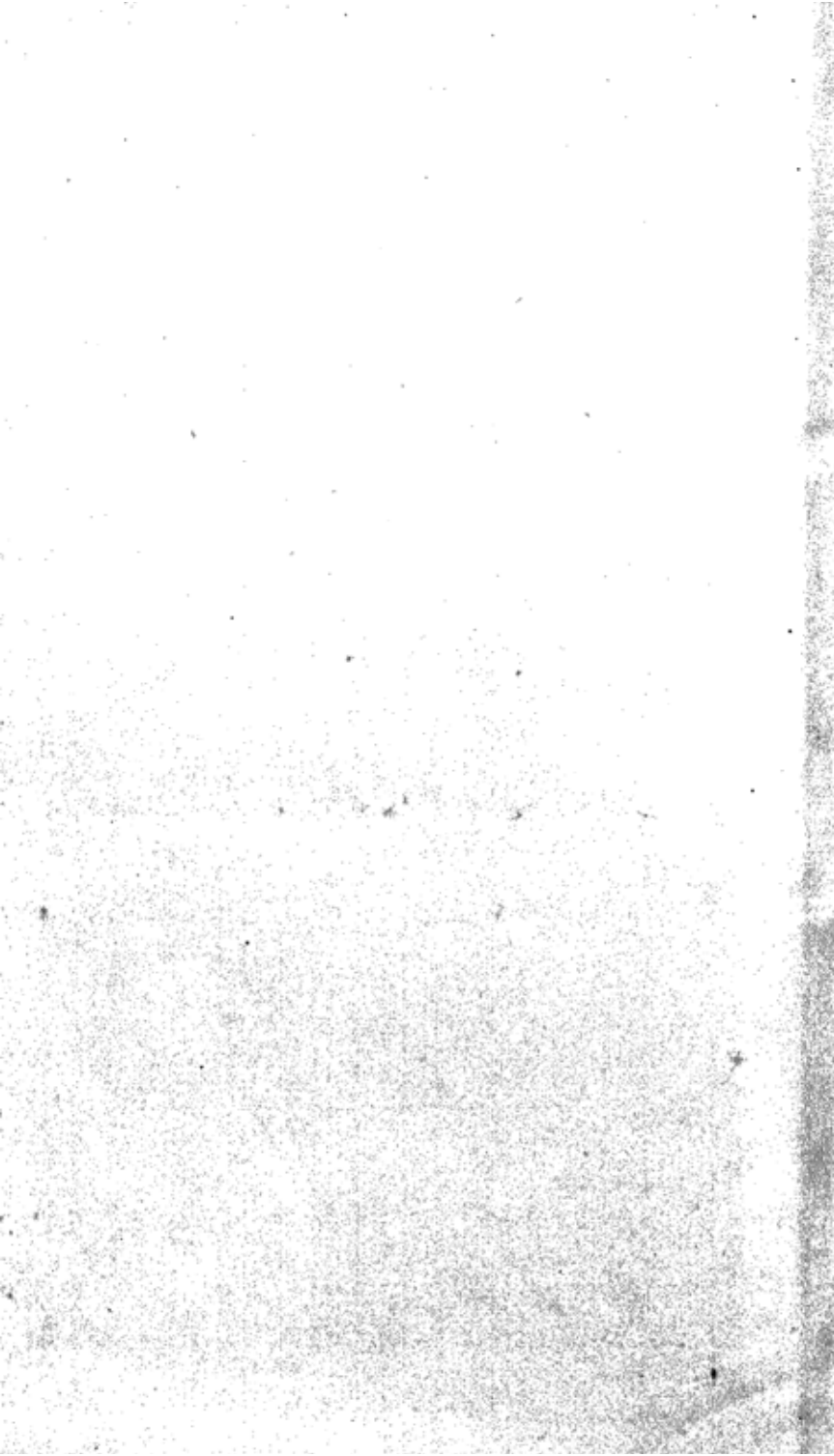
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